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ABSTRACT

This eighth in a series of twenty-nine learning modules on instructional execution is designed to give secondary and postsecondary vocational teachers the background knowledge and experience needed to use problem solving as an instructional method in the classroom and laboratory. The terminal objective for the module is to direct students in applying problem-solving techniques in an actual school situation. Introductory sections relate the competency dealt with here to others in the program and list both the enabling objectives for the four learning experiences and the resources required. Materials in the learning experiences include required reading, a self-check quiz with model answers, performance checklists, case studies to critique, model critiques, and the teacher performance assessment form for use in evaluation of the terminal objective. (The modules on instructional execution are part of a larger series of 100 performance-based teacher education (PBTE) self-contained learning packages for use in preservice or inservice training of teachers in all occupational areas. Each of the field-tested modules focuses on the development of one or more specific professional competencies identified through research as important to vocational teachers. Materials are designed for use by teachers, either on an individual or group basis, working under the direction of one or more resource persons/instructors.) (BM)

ED149072

MODULE

C-8

Direct Students in Applying Problem-Solving Techniques

MODULE C-8 OF CATEGORY C—INSTRUCTIONAL EXECUTION
PROFESSIONAL TEACHER EDUCATION MODULE SERIES

The Center for Vocational Education
The Ohio State University

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NATIONAL INSTITUTE OF EDUCATION

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CE 014 308

FOREWORD

This module is one of a series of 100 performance-based teacher education (PBTE) learning packages focusing upon specific professional competencies of vocational teachers. The competencies upon which these modules are based were identified and verified through research as being important to successful vocational teaching at both the secondary and post-secondary levels of instruction. The modules are suitable for the preparation of teachers in all occupational areas.

Each module provides learning experiences that integrate theory and application; each culminates with criterion referenced assessment of the teacher's performance of the specified competency. The materials are designed for use by individual or groups of teachers in training working under the direction and with the assistance of teacher educators acting as resource persons. Resource persons should be skilled in the teacher competency being developed and should be thoroughly oriented to PBTE concepts and procedures in using these materials.

The design of the materials provides considerable flexibility for planning and conducting performance-based preservice and inservice teacher preparation programs to meet a wide variety of individual needs and interests. The materials are intended for use by universities and colleges, state departments of education, post-secondary institutions, local education agencies, and others responsible for the professional development of vocational teachers. Further information about the use of the modules in teacher education programs is contained in three related documents: **Student Guide to Using Performance-Based Teacher Education Materials, Resource Person Guide to Using Performance-Based Teacher Education Materials** and **Guide to Implementation of Performance-Based Teacher Education.**

The PBTE curriculum packages are products of a sustained research and development effort by The Center's Program for Professional Development for Vocational Education. Many individuals, institutions, and agencies participated with The Center and have made contributions to the systematic development, testing, revision, and refinement of these very significant training materials. Over 40 teacher educators provided input in development of initial versions of the modules; over 2,000 teachers and 300 resource persons in 20 universities, colleges, and post-secondary institutions used the materials and provided feedback to The Center for revision and refinement.

Special recognition for major individual roles in the direction, development, coordination of testing, revision, and refinement of these materials is extended to the following program staff: James B. Hamilton, Program Director; Robert E. Norton, Associate Program Director; Glen E. Fardig, Specialist; Lois Harrington, Program Assistant; and Karen Quinn, Program Assistant. Recognition is also extended to Kristy Ross, Technical Assistant; Joan Jones, Technical Assistant; and Jean Wisenbaugh, Artist for their contributions to the final refinement of the materials. Contributions made by former program staff toward developmental versions of these materials are also acknowledged. Calvin J. Cotrell directed the vocational teacher competency research studies upon which these modules are based and also directed the curriculum development effort from 1971–1972. Curtis R. Finch provided leadership for the program from 1972–1974.

Appreciation is also extended to all those outside The Center (consultants, field site coordinators, teacher educators, teachers, and others) who contributed so generously in various phases of the total effort. Early versions of the materials were developed by The Center in cooperation with the vocational teacher education faculties at Oregon State University and at the University of Missouri-Columbia. Preliminary testing of the materials was conducted at Oregon State University, Temple University, and University of Missouri-Columbia.

Following preliminary testing, major revision of all materials was performed by Center Staff with the assistance of numerous consultants and visiting scholars from throughout the country.

Advanced testing of the materials was carried out with assistance of the vocational teacher educators and students of Central Washington State College; Colorado State University; Ferris State College, Michigan; Florida State University; Holland College, P.E.I., Canada; Oklahoma State University; Rutgers University; State University College at Buffalo; Temple University; University of Arizona; University of Michigan-Flint; University of Minnesota-Twin Cities; University of Nebraska-Lincoln; University of Northern Colorado; University of Pittsburgh; University of Tennessee; University of Vermont; and Utah State University.

The Center is grateful to the National Institute of Education for sponsorship of this PBTE curriculum development effort from 1972 through its completion. Appreciation is extended to the Bureau of Occupational and Adult Education of the U.S. Office of Education for their sponsorship of training and advanced testing of the materials at 10 sites under provisions of EPDA Part F, Section 553. Recognition of funding support of the advanced testing effort is also extended to Ferris State College, Holland College, Temple University, and the University of Michigan-Flint.

Robert E. Taylor
Director
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THE CENTER FOR VOCATIONAL EDUCATION
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The Center for Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning and preparation. The Center fulfills its mission by:

- Generating knowledge through research.
- Developing educational programs and products.
- Evaluating individual program needs and outcomes.
- Installing educational programs and products.
- Operating information systems and services.
- Conducting leadership development and training programs.

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The American Association for Vocational Instructional Materials (AAVIM) is an interstate organization of universities, colleges and divisions of vocational education devoted to the improvement of teaching through better information and teaching aids.

INTRODUCTION

As vocational teachers, we are concerned with helping our students develop the knowledge, skills, and attitudes they need to live and work in this society. One of the most important of these abilities is the ability to solve problems on their own, and to apply problem-solving techniques to the great variety of situations they will meet in life.

Clearly, if we tell our students the right answer to every question, the best solution to every problem, we will not be giving them an opportunity to learn to apply problem-solving techniques. They may know the answers you've given them, but it is questionable that, when faced with a new problem or decision, they will know how to approach it on their own.

The underlying assumption of this module is that developing a student's ability to **think critically** (identify a problem, gather relevant information, evaluate the evidence, assess the alternatives, etc.) is a primary responsibility of teachers. The learning experiences in this module are designed to give you the background knowledge and experience you need to use problem-solving as an instructional method in the classroom and laboratory.

ABOUT THE MODULE

Objectives

Terminal Objective: In an actual school situation, direct students in applying problem-solving techniques. Your performance will be assessed by your resource person, using the Teacher Performance Assessment Form, pp. 55–56 (*Learning Experience IV*).

Enabling Objectives:

1. After completing the required reading, demonstrate knowledge of problem-solving techniques and how to use problem-solving as an instructional method (*Learning Experience I*).
2. Given a simulated problem situation, direct, or critique the direction of, a student in applying problem-solving techniques (*Learning Experience II*).
3. For a simulated classroom situation, execute, or critique the execution of, a problem-solving lesson (*Learning Experience III*).

Prerequisites

To complete this module, you must have competency in developing a lesson plan. If you do not already have this competency, meet with your resource person to determine what method you will use to gain this skill. One option is to complete the information and practice activities in the following module:

- *Develop a Lesson Plan*, Module B–4

Resources

A list of the outside resources which supplement those contained within the module follows. Check with your resource person (1) to determine the availability and the location of these resources, (2) to locate additional references in your occupational specialty, and (3) to get assistance in setting up activities with peers or observations of skilled teachers, if necessary. Your resource person may also be contacted if you have any difficulty with directions, or in assessing your progress at any time.

Learning Experience I

Optional

A locally-produced videotape of a teacher directing students in applying problem-solving techniques which you can view for the purpose of critiquing that teacher's performance.

Videotape equipment for viewing a videotaped presentation involving the use of problem-solving techniques.

Learning Experience II

Required

A peer to role-play a student whom you are directing in applying problem-solving techniques, and to critique your performance in directing him/her in applying problem-solving techniques. If a peer is unavailable, an alternate activity has been provided.

Optional

Videotape equipment for taping, viewing, and self-evaluating your direction of the peer.

Learning Experience III

Required

1–5 peers to role-play the students to whom you are presenting a problem-solving lesson, and to critique your performance in presenting a problem-solving lesson. If peers are unavailable, an alternate activity has been provided.

Optional

A resource person to evaluate your competency in developing a lesson plan.

Videotape equipment for taping, viewing, and self-evaluating your presentation.

Learning Experience IV

Required

An actual school situation in which you can direct students in applying problem-solving techniques.

A resource person to assess your competency in directing students in applying problem-solving techniques.

This module covers performance element numbers 88, 89 from Calvin J. Cotrell *et al.*, *Model Curricula for Vocational and Technical Education: Report No. V* (Columbus, OH: The Center for Vocational Education, The Ohio State University, 1972). The 384 elements in this document form the research base for all The Center's PBTE module development.

For information about the general organization of each module, general procedures for their use, and terminology which is common to all 100 modules, see About Using The Center's PBTE Modules on the inside back cover.

Learning Experience I

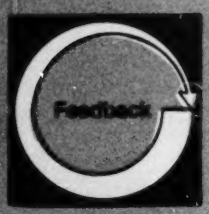
OVERVIEW

After completing the required reading, demonstrate knowledge of problem-solving techniques and how to use problem-solving as an instructional method.

You will be reading the information sheet, Directing Students in Applying Problem-Solving Techniques, pp. 6–15.

You may wish to view a locally-produced videotape of a teacher directing students in applying problem-solving techniques, and to critique that teacher's performance.

You will be demonstrating knowledge of problem-solving techniques and how to direct students in applying these techniques by completing the Self-Check, pp. 17–18.



You will be evaluating your competency by comparing your completed Self-Check with the Model Answers, p. 9.

Activity

For information explaining the steps involved in the problem-solving process and describing how to use problem-solving as an instructional method, read the following information sheet:

DIRECTING STUDENTS IN APPLYING PROBLEM-SOLVING TECHNIQUES

Many situations in life present problems that need to be solved. A problem exists in any situation in which there is a difficulty or uncertainty which needs some creative or logical solution.

Problems that need solutions can arise in one's home life as well as on the job. For example, how can a family with a limited income use their finances to provide adequately for food, shelter, and clothing and still have funds available for recreational purposes? How can an employee deal with a supervisor who is unknowingly creating friction between the members of his/her staff? In

order to deal with these problems that arise, a rational and organized approach is needed which can be applied in developing solutions to these problems.

One valuable technique that is commonly used to deal with a problem is called problem-solving. This technique requires the collection, application, and testing of information for the purpose of determining an appropriate solution to an existing problem. The problem-solving approach is a systematic procedure which involves the following basic steps:

1. formulating and defining the problem clearly and concisely
2. identifying the relevant factors
3. gathering the needed information (facts and knowledge about the problem)
4. examining possible solutions to the problem
5. selecting a tentative solution or alternative solutions
6. testing the proposed solution(s)
7. assessing the results of the testing

The following example illustrates the problem-solving approach: Mr. O'Leary, a recently employed teacher, has the option of enrolling in a group medical benefits program. The program has two plans from which he may select. Mr. O'Leary wants to enroll, but is unsure of which plan would be most suitable for his situation.

First, he analyzes the situation in terms of his estimated immediate and future medical needs and those of his spouse and children. As a result of this analysis, he is able to compile a list of his family's possible medical needs.

Next, Mr. O'Leary makes a careful review of both plans to determine types of coverage, costs, length of coverage, etc. As these facts are gathered and examined, he determines that Plan A would be most appropriate to satisfy his family's predicted medical needs. Accordingly, he enrolls in Plan A.

During the course of the next year, Mr. O'Leary's eldest daughter loses both her front teeth by falling out of a tree. Such dental care is not covered by Plan A and Mr. O'Leary is forced to cover the entire cost of the rather large dental bill by himself.

At the end of the year, he reevaluates his decision to enroll in Plan A. He reviews the family's actual medical needs of the past year and how much of the resulting expenses were covered by

Plan A. He determines that, except for the dental bill, Plan A suited the family well. However, since the family includes a number of active, tree-climbing children, Mr. O'Leary decides to drop Plan A and enroll in Plan B which has broader coverage, including dental emergencies, than Plan A.

In this example, the new teacher faced a problem—which plan to choose in order to meet his family's medical needs. In order to solve the problem, he identified relevant factors in terms of (1) his family's estimated immediate and future medical needs, and (2) the coverage provided by each plan. Then, he gathered information on each factor.

Mr. O'Leary used this information in selecting a tentative solution—to enroll in Plan A. The solution was tested throughout the following year by assessing how adequate Plan A was in **actually** meeting the family's medical needs. In this case, the assessment was negative since Mr. O'Leary had not accurately predicted the family's future medical needs.

Using problem-solving as an instructional technique has many values for the vocational educator. It can develop incentives for learning by involving students in solving problems of their own or problems that are of interest to them. It can provide a vehicle for students to use their knowledge and apply their skills. Most occupations require the solution of problems using various kinds of knowledge and skill. Thus, students need experience in applying what they know to new problems.

Furthermore, **evaluation** of students can be based upon their ability to solve practical problems that require them to apply several competencies to reach the solution. For example, a student in a radio and television repair class may be required to diagnose and then repair a malfunctioning television set. This problem-solving activity can provide a realistic learning activity for the student and also enables the teacher to determine how well the student applied his/her knowledge and skills in the problem-solving situation.

The use of problem-solving techniques in group situations can also encourage active participation by students and can develop effective student-teacher interaction processes. It is very helpful in promoting discussion geared to the student's level of understanding. Cooperative group discussion, with students relating to the teacher as a co-member in the group, can assist students in attaining and retaining knowledge as a result of their active participation in formulating and discussing solutions to problems.

There are several approaches that you, as a vocational teacher, may use to direct students in applying problem-solving techniques. Although these approaches will be discussed in terms of their use with groups of students, these same techniques can be adapted for use with individual students.

Step I.—The first step in problem-solving is to determine what the problem is and to define it clearly. In normal circumstances, one recognizes that there is some sort of problem and then tries to pin it down. In the classroom, the problems to be discussed are very often real problems selected specifically to meet the needs of the lesson or the unit being taught. Problems may also be manufactured by the teacher for timely introduction to the class.

There are at least three methods of identifying problems for the class to use: (1) the problem can be brought up by an individual student who is experiencing the problem; (2) the teacher can present a problem area and then draw out the specific problem from the class by asking students to relate experiences they have had with problems in that area; or (3) the teacher can present a written or oral case problem which will require students to solve a problem in the area being studied. Let's take a closer look at each of these three introductory methods.

Assume you are involved in teaching a unit on "Getting a Job" which includes lessons on locating job opportunities, selecting the right job, filling out an application, handling a job interview, etc. At the end of a lesson on locating job opportunities, one of your students, Sean, says, "I have been promised a part-time job, but I can't take it because I can't get transportation to and from work." Since transportation is a key factor in getting a job, Sean's problem could be an excellent starting point for getting students involved in dealing with the topic of transportation.

Perhaps the most effective way to introduce a problem is to draw it out through class discussion. With practice, you can do this in such a way that the students perceive the problem as their own. You may pose leading questions to start and

guide discussion toward the problem situation you wish to use. In introducing a lesson on locating job opportunities, you might get students to relate past experiences to the topic by asking, "Have you ever tried to find a job? What kinds of problems did you have?" Then, building upon student responses, you can lead them to the statement of the specific problem statement desired for the lesson.

Or, you could start the lesson on selecting the right job by inventing a related problem. For example, you could hand out a printed case problem describing how Jean Kline, a business and office student, was offered two equally attractive and well-paying jobs upon graduation. Students would then need to determine how Jean should decide which job to accept.

The potential drawback of problems introduced to the class spontaneously, or in response to direct questions from the teacher, is that these problems may or may not include the key areas the teacher wishes to cover. The case problem, however, can be specifically targeted to include these key areas.

In the case of Jean Kline, the teacher would write the problem so that students were provided with all the information they would need to deal with Jean's problem. In addition, the case problem would be written so that students had to deal with key areas of the lesson or unit in order to solve the problem. Case problems not only involve students in lesson topics, they also allow problems dealing with human relationships to be discussed objectively, without involving any direct references to class members.

Whichever of the three methods is used to introduce the problem, the next task is to direct students in defining and stating the problem clearly and concisely. The problem statement should be descriptive of the difficulties to be overcome and should include such information as (1) who or what is affected by the problem; (2) what conditions are causing the problem; and (3) what the goal is.

For example, consider Sean's problem which was mentioned previously. Sean is the one affected by the problem. The problem is being caused by a lack of transportation, and the goal is to find transportation so he can get the job. The problem statement, then, could be worded as follows:

> Sean has been promised a part-time job, but cannot take it unless he can find transportation to get there. How can Sean get the transportation he needs.

It should be emphasized at this point that a well-worded statement of the problem is critical if the problem-solving approach is to be successfully used by the group. This means that an accurate and complete statement must be prepared that is written in terms that are clearly understood by all members of the group.

The process of communication and information-gathering will soon break down if there are several interpretations of what the problem under investigation actually is, or if the statement is off-base. For example, if Sean's goal had been defined as "getting the part-time job," we would end up dealing with a much broader area than the actual problem involves.

The following is another example of the hazards of a faulty problem statement. A student comes to the teacher and says, "I have to quit my job because the kid who gave me a ride there just got his hours changed." The teacher, assuming that the problem is "lack of transportation," spends a great deal of time aiding the student in solving that problem (i.e., finding another mode of transportation). At the end of the problem-solving session, during which the student was

fairly unenthusiastic about most of the options, the student finally announces, "Well, see, I really want to quit anyway, but I don't want to tell my boss 'cause I'm afraid he'll be mad." Wrong problem!

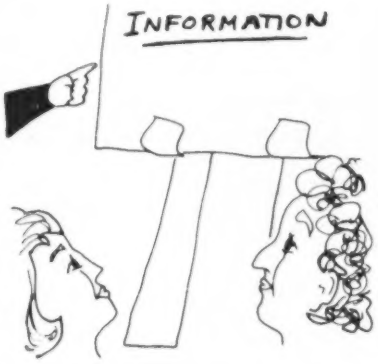
Step II.—After the problem has been formulated and defined clearly, the class needs assistance in determining the factors that are involved in, or associated with, that problem. In other words, what questions need to be answered, and what further information is needed in what areas, before a tentative solution can be arrived at?

In Sean's case, he would need information on (1) the availability, feasibility, reliability, and cost of each of the following types of transportation: bus service, car pool, buying a car, riding his bicycle; (2) the exact days, hours, and wages that would be involved in the part-time job; and (3) his financial status in terms of meeting costs involved in transportation.

The use of questions to elicit these factors is an effective technique to use in the problem-solving method. While preparing the plan for a lesson in which you will use problem-solving techniques, questions should be formulated which will identify the types of information needed to solve the problem. These questions should commit the students to defend their statements, and should stimulate interaction among the students, and between students and the teacher directing the discussion.

To illustrate, suppose you asked your students, "What kinds of questions does Sean need to have answered before considering possible solutions?" After students have generated a tentative list of questions or factors to be considered, you could ask, "Which of these factors is most critical, and why?" After this question has been answered by a single student, you could then ask the other class members whether they agree with that answer and, if not, to add their own viewpoints. Through well-prepared questions, you should be able to stimulate class participation in identifying the relevant factors.

Step III.—The third step in problem-solving is to obtain information about the factors that have been identified. A good beginning point is to determine what facts or information the class already possesses. This may be obtained through further questioning and discussion.



Then specific questions need to be listed relative to the additional information needed. These questions, often called "questions for study," should be drawn from the students. Each question for study should focus upon a specific bit of information needed in solving the problem. In the case of Sean's transportation problem, some questions for study would be, Is bus service available at the times needed? How much does it cost to ride the bus? How much would a dependable automobile cost? How much could Sean afford to pay for an automobile? Could Sean's hours be changed if needed?

Many resources may be used by students to locate needed information. Students can consult with experts, authorities, or other persons who might be of assistance. They can also locate and review printed materials which pertain to the problem area. In Sean's case, he would need to check (1) with the bus company for bus schedules; (2) with his prospective employer to determine his exact work schedule and salary, and to see if the employer knows of someone Sean could ride with; (3) for newspaper ads asking for persons to share rides (or he could run such an ad); and (4) with persons such as bankers or car dealers who could advise him on his financial ability to purchase a car; etc.

One technique that is often used to obtain information about the factors is a supervised study session.[1] The supervised study session is a time during which students are provided with the resources needed to obtain the necessary information. The teacher is available to assist and direct their efforts to gather the information they need. During this time, the students can review refer-

1. To gain skill in managing a supervised study session, you may wish to refer to Module C–6, *Guide Student Study.*

ences, discuss their findings with each other, and compile their findings for presentation to the class.

The supervised study session may be conducted effectively in a variety of ways. When there are only a few questions for study and adequate copies of needed references are available for all students, you may ask each student to find answers to all questions individually. If there are several questions for study or limited numbers of references for specific questions, you may wish to assign or have students volunteer to find the needed information for one or two questions each and to share that information with the class. Similarly, small group assignments can be made and the findings shared with the class. In some cases you may want students to collect and compare information from several authoritative sources.

Another information-gathering technique is to use community resources such as parents, or persons employed in business, industry, or government agencies. In planning a problem-solving activity for a particular unit of study, it is helpful to have a list of possible resource persons for students to contact in compiling information about the problem.

As the facts and information are being compiled, they may be organized according to the specific factors involved in the problem. Compiling the information in this way will assist the students in evaluating possible solutions to the problem. For example, Sample 1 shows how students could organize the factors involved in locating transportation for Sean. Information organized in this manner can be readily evaluated and used in examining tentative solutions to problems.

Pulling the information together in an organized form has benefits for the student beyond the solving of the immediate problem at hand. It reinforces technical information obtained and, when recorded by the student, it can serve as a reference for future use both in class and on the job.

Step IV.—After the facts and information have been compiled, the teacher needs to guide the class in using the information they have gathered to determine possible solutions to the problem. Several techniques may be used to promote the discussion of possible solutions to a problem. After the information has been obtained and organized, each student may be requested to list on paper his/her own tentative solutions. These lists could then be used as a basis for class discussion.

Another approach is simply to ask for suggestions from the class and to list them on the chalkboard. For example, the format shown in Sample 2 could be used to generate discussion about possible solutions to Sean's problem.

As the class discusses the possible solutions, it may find that insufficient information has been collected and more facts are needed. Sean, for example, will now need information on the feasibility of working on Saturdays only and on the factors involved in purchasing a car. This may require the teacher to supply the information or to allow an additional amount of time for data gathering.

SAMPLE 1

ORGANIZING FACTORS

FACTORS	POSSIBLE FORMS OF TRANSPORTATION			
	Take a Bus	Ride in a Car Pool	Purchase Own Car	Ride a Bicycle
Availability (to meet job schedule)				
Cost				
Reliability				
Sean's Financial Ability				

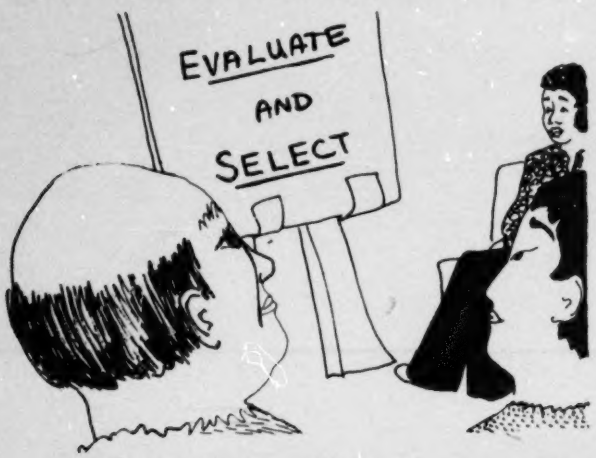
SAMPLE 2

SOLUTION FORMAT

PROBLEM STATEMENT: Sean has been promised a part-time job, but cannot take it unless he can find transportation to get there. How can Sean get the transportation he needs?

FACTS	POSSIBLE SOLUTIONS	FINAL CHOICE
1. Sean will earn $56 a week. 2. He will work 28 hours a week, from 6–10 Monday through Friday and from 9–6 on Saturday. 3. Buses do not run at night, but he could take a bus on Saturday for 50¢ each way. 4. No one was found who could provide transportation at the times needed. 5. Sean has $700 in the bank. 6. A car dealer indicated that for $700, Sean could, in fact, buy an older used car and there were ads in the paper for cars in that price range. 7. The job is located 11 miles from his home so his mother has forbidden him to use his bike for transportation because she doesn't want him riding home on a bike at 10 p.m.	1. Purchase a car. 2. Work Saturdays only.	

Step V.—As the class reacts to the proposed solutions, some disagreements may develop among the students. The teacher must be careful to guide and lead the discussion so that it does not turn into an argument among the students in the group. In determining the solution to the problem, the teacher needs to guide students in evaluating each proposed solution and selecting the one which appears to be most appropriate. Many times, the appropriate solution may vary according to individual needs. At other times, there will be no one correct solution to a problem, such as one dealing with human relationships.



Steps VI and VII.—The final steps are to test the proposed solution and assess the results. One way in which this can be accomplished is by actually trying out the solution. For example, the teacher who selected Insurance Plan A actually used the plan in order to determine its adequacy.

In other situations, the final solution may be tested mentally; i.e., the situation is evaluated through discussion or consulting authorities until a final conclusion is reached. Mental testing is appropriate when students are working with a case problem or other problem for which immediate testing is unrealistic. At the conclusion of the problem-solving lesson, it is important for the teacher to summarize the learning experience by guiding the class in reviewing what has been learned or discovered.

It should be noted that these seven steps are not always covered within the limits of a single lesson. Simple case problems may be solved in a class period, but at times, a problem may require days, or even weeks, to solve. At other times, it may be desirable to guide students only part way through the process and then allow them to finish on their own. The class time needed will depend on the scope and complexity of the problem.

By now you have probably realized that teaching students by using problem-solving techniques is a sophisticated process which requires some thorough planning by the teacher. It is important that the teacher be organized and think through each step in the problem-solving process. Once the steps have been identified, the teacher needs to develop or select appropriate methods for teaching each step so that the problem-solving experience will be meaningful and productive for the students.

In preparing a lesson plan for the problem-solving approach, there are several factors to consider. First, there is some preliminary information that should be presented at the top of the lesson plan. This information will include the unit under study, the lesson topic, and the topic objective.

Next, the plan should specify how the lesson will be introduced. Depending on the methods to be used in the body of your lesson, different introductory methods can be used. You can ask leading questions to get students to identify possible problem areas or to get them actively involved in the lesson. Or, you can introduce the lesson using a brief case problem which will orient students to the lesson topic and stimulate their thinking. Whatever method you choose to use to introduce the lesson needs to motivate

students and direct their attention to the topic to be covered. This introduction needs to be outlined in the lesson plan.

In the lesson development section, each step in the problem-solving process should be listed, accompanied by a detailed explanation of the methods and techniques that will be used to cover each step with the students. For example, in developing a statement of the problem, the key questions to ask the class in identifying who or what is affected, what conditions are causing the problem, etc., should be listed in the plan. Other techniques, such as writing students' responses on the blackboard, should also be included. Some points or special techniques may be critical to a particular lesson; these should be identified by an asterisk or underlining.

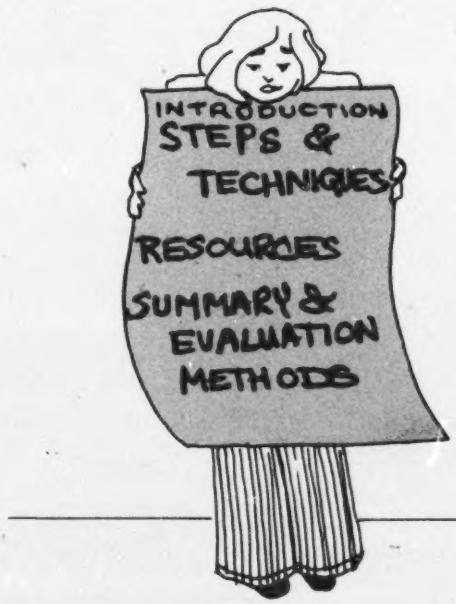
Key questions should be listed that the teacher will ask students in guiding identification of factors to be considered. The factors and/or specific questions for study should also be listed to help ensure that any important items will not be missed as these are drawn from students.

A listing of the resources to be used in the lesson or by students in locating the information needed to solve the problem should also be part of the lesson plan. These resources would include books, pamphlets, magazines, individuals in the community, teachers in the school, or individuals in local business or industries. This list may also be duplicated and used by the students in locating various resources from which to gather information about the problem.

In the final section of the plan, the methods to be used in summarizing the lesson and evaluating student achievement should be specified. The plan could include a list of questions to be asked in guiding students in making final conclusions and assessments of the solution that was selected to solve the problem. The evaluation section should indicate how the teacher will determine if the students have achieved the lesson objective and how well they performed in using problem-solving techniques.

The methods used to evaluate students will vary according to the topic of the lesson. For example, in a lesson on insurance, the students may be asked to apply their knowledge to a new, but similar, situation on a paper-pencil test. A lesson using problem-solving techniques in a T.V. repair class could involve students in using problem-solving techniques to actually repair a malfunctioning T.V. set.

Sample 3 is an example of a lesson plan developed for a lesson on grooming for the job interview which uses the problem-solving method to present information.



SAMPLE 3

PROBLEM-SOLVING LESSON PLAN

UNIT: Getting a Job

LESSON TOPIC: Job Interview: Grooming

OBJECTIVE: Given information on an individual's characteristics and job characteristics, students will correctly determine how the individual should groom for a job interview.

INTRODUCTION:

5 MIN.

- Review briefly prior lesson on preparing for the interview.
- Show pictures of persons who are well-groomed . . . but not in a way which is appropriate for a job interview (e.g., girl dressed for formal dance, etc.).
- Describe problem situation of Alan Tiffany and develop the problem statement: "How should Alan Tiffany groom himself for his job interview?"

METHOD:

A. Brainstorming/Discussion

5 MIN.

KEY QUESTIONS TO ASK TO IDENTIFY FACTORS	FACTORS TO BE IDENTIFIED BY STUDENTS
What is there about Alan Tiffany that will affect your decision?	Personal Characteristics
What is there about the job that will affect your decision?	Job Characteristics
What else might be important in helping make your decision?	Alan's Resources

B. After brainstorming and identification of the factors, students will identify a list of questions for study for the teacher to write on the board.

5 MIN.

QUESTIONS FOR STUDY

1. What types of clothes look well on different persons (in terms of their weight, height, coloring, etc.)?
2. What types of clothes should some individuals avoid?
3. What type of job is Alan applying for?
4. How formal an organization is it?
5. What type clothing do the employees and supervisors wear on the job?
6. Is it the type of job in which appearance is critical (e.g., one which involves dealing with the public)?
7. What clothes does Alan have to choose from?
8. Can he afford to purchase a new outfit?

C. Supervised study—students will be given their individual copy of the booklet "Guidelines for Grooming" and a copy of the case problem [which would be attached to this plan] giving all needed information about Alan Tiffany and the job for which he is applying.

15 MIN.

Students will work in groups of approximately five answering the questions for study and arriving at tentative solutions to the problem.

D. Students will meet in large-group situation to discuss answers to questions, present proposed solutions to the problem.

15 MIN.

RESOURCES: "Guidelines for Grooming"
Alan Tiffany Case Problem

SUMMARY: Students will prepare written summaries (on an individual basis) explaining the final solution they would select, and why (based on what factors).

10 MIN.

EVALUATION: Students will compare their written summary with the model answer [which would be attached to the lesson plan].

Your institution may have available videotapes showing examples of teachers directing students in applying problem-solving techniques. If so, you may wish to view one or more of these videotapes. You might also choose to critique the performance of each teacher directing students in applying problem-solving techniques, using the criteria provided in this module, or critique forms or checklists provided by your resource person.

NOTES

The following items check your comprehension of the material in the information sheet, Directing Students in Applying Problem-Solving Techniques, pp. 6–15. Each of the five items requires a short essay-type response. Please explain fully, but briefly, and make sure you respond to all parts of each item.

SELF-CHECK

1. Explain why the problem-solving method of teaching is appropriate for teaching skills and knowledge to students.

2. If a teacher is interested in teaching students about human relationships by using the problem-solving method, what technique might he/she use, and why?

3. If students already recognize that a problem exists and can define it, is their next step to formulate possible solutions? Why or why not?

4. If students have difficulty in gathering information about the factors involved with the problem, how can the teacher remedy the situation?

5. What should a teacher include in a lesson plan to ensure that students are applying problem-solving techniques?

Compare your written responses on the Self-Check with the Model Answers given below. Your responses need not exactly duplicate the model responses; however, you should have covered the same **major** points.

MODEL ANSWERS

1. The problem-solving method of teaching is helpful in motivating students to engage in learning. The use of problems relevant to student interests and needs helps students recognize a need for obtaining the knowledge and skills needed to solve the problem.

   The use of problem-solving situations provides an opportunity for the immediate use of the knowledge or skill in solving realistic actual problems in the classroom rather than simply being required to learn skills for future use. Problem-solving also assists in developing in students critical thinking processes which can be applied and used in other subjects and situations that they encounter.

2. The case problem would be the most appropriate technique. It has the advantage of allowing problems dealing with human relationships to be discussed in an impersonal manner without relating them directly to any class members. The case problem also provides a specific, concrete situation for students to use in applying problem-solving techniques and procedures.

3. After students have defined a problem, their next step is to identify relevant factors. If students begin to formulate solutions to a problem without identifying related facts, it is very likely that an inappropriate or unsuitable solution will be found. You would be teaching them to guess, not solve problems.

4. If students have difficulty in gathering information, it may be that the problem and the related factors were not defined accurately or precisely. In order to remedy the situation, the teacher will have to help the students restate the problem and redefine the related factors. The teacher may also be able to help by making the questions for study quite specific in relation to the information available in references.

   Another cause may be a lack of appropriate resources for students to use. The teacher could provide a list of resources and their location to help students overcome their initial difficulty in locating resources. Additional follow-up assistance in using the resources may also have to be provided for some students.

5. In the method section, the lesson plan should include the problem-solving steps and identify how each step will be accomplished. This will involve stating what methods will be used with the students, what questions will be used in leading the discussion, and what resources will be used by the students.

LEVEL OF PERFORMANCE: Your completed Self-Check should have covered the same **major** points as the model responses. If you missed some points or have questions about any additional points you made, review the material in the information sheet, Directing Students in Applying Problem-Solving Techniques, pp. 6–15, or check with your resource person if necessary.

NOTES

Learning Experience II

OVERVIEW

Given a simulated problem situation, direct, or critique the direction of, a student in applying problem-solving techniques.

NOTE: The next five items involve role-playing with a peer. If a peer is not available to you, proceed directly to the explanation of the alternate activity which follows.

You will be helping a peer prepare to play the role of a student who needs help in solving a problem, using the Job Selection Sheet, p. 23.

You will be directing the peer in applying problem-solving techniques to the Problem Situation, p. 24.

You may wish to videotape your performance for self-evaluation purposes.

Your performance in directing the application of problem-solving techniques will be evaluated by your peer, using the Problem-Solving Checklist, p. 25.

If you videotaped your performance, you may wish to self-evaluate your own performance, using the Problem-Solving Checklist, p. 27.

You will be reading the Case Study, p. 29, and writing a critique of the manner in which the teacher directed a student in applying problem-solving techniques.

You will be evaluating your competency in critiquing the Case Study by comparing your completed critique with the Model Critique, p. 31.

NOTE: The following activities involve role-playing with a peer. If a peer is not available to you, turn to p. 29 for an explanation of the alternate activity.

Ask one of your peers to assist you in this learning experience. This peer will serve two functions: (1) he/she will role-play the student whom you are directing in applying problem-solving techniques, and (2) he/she will evaluate your performance. To help this peer develop his/her role, have the peer read through the 11 questions on the Job Selection Sheet which follows and think through how he/she would answer each question. The questions are designed to help the peer think about his/her real feelings concerning the important considerations in selecting a job.

JOB SELECTION SHEET

1. Which is more important to you, job satisfaction or financial reward?
2. Would you give up evenings and weekends to get ahead in your job?
3. Are you a "team player" or a "loner"?
4. If your job required it, would you move to a city far away from your home town?
5. Do you react well to fierce competition, or does it make you uncomfortable?
6. Would you like to own your own business? . . . be your own boss?
7. Which would you prefer, a 9–5 "time clock" sort of job, or one which leaves the responsibility for completing work (whatever the hours) up to you?
8. Which do you prefer, city living or small town life?
9. Do you need a pleasant, attractive work environment in order to work efficiently?
10. How do you react to heavy pressure? . . . deadlines?
11. Are you willing to put off financial reward (work your way up), or do you expect immediate returns?

Ask your peer to assume that he/she is involved in the following Problem Situation. Guide the peer in identifying and defining the problem to be solved, determining the factors, gathering or identifying information needed to solve the problem, examining possible solutions, selecting a tentative solution, and mentally evaluating the proposed solution. **NOTE:** Some relevant information may be missing. If so, you will need to help the peer determine what other facts are needed and how these facts can be located.

PROBLEM SITUATION

You have just graduated from high school, and have been offered two jobs, one in your small home town and one in a large city 2,000 miles away.

The job in the city pays twice as much as the job in your home town and the opportunities for advancement and raises are quite good. One reason the rewards are so great is that the pressures and responsibilities for self-motivation in completing work are heavy.

If you make good (you'll be competing against several other people, all of whom were picked for their skill and initiative), you'll probably be put in a supervisory position in a year or so, and how far you advance will depend on you. The personnel manager has told you that they are looking for someone who works well with other people; cooperation is necessary if the job is to get done right.

During your interview, you overheard several employees talking about putting in another long night to get some work out; one said he thought he'd have to come in on Saturday to meet the deadline.

The work surroundings look quite comfortable. Since there are no windows, the noise from the heavy city traffic and the smoke from the nearby factories won't be a problem.

The job in your home town has a much smaller salary, and raises (if any) will depend on how business is in a given year. However, the employer has been good friends with your family for years and has no family of his own. He would probably give you the option to buy the business in 10 or 15 years if you have the money and desire to do so. Therefore, your future has real possibilities if you decide to accept this job.

Nobody works past 6 p.m. at this job; working on weekends is practically unheard of. The employees are highly individualistic and value their privacy. Their lives away from the office are more important to them than their working lives and their jobs depend more on seasonal fluctuations than on their ability to out-perform someone else. Therefore, competition is minimal. The easy pace of the job reflects the life style of the community; the sidewalks are rolled up at 9 p.m.

If you wish to self-evaluate, you may record your performance on videotape so you may view your own skill in directing a peer in applying problem-solving techniques at a later time.

Multiple copies of the Problem-Solving Checklist are provided in this learning experience. Give a copy to your peer before directing him/her in the role-play situation in order to ensure that he/she knows what to look for during the role-play. However, indicate that during the role-play, all attention is to be directed toward you, and that the checklist is to be completed **after** the role-play is finished.

If you videotaped your lesson, you may wish to self-evaluate using a copy of the Problem-Solving Checklist.

PROBLEM-SOLVING CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

LEVEL OF PERFORMANCE

	N/A	No	Partial	Full
Under the teacher's guidance and direction, the student was able to:				
1. clearly identify and define the problem	☐	☐	☐	☐
2. identify all major factors involved in the problem	☐	☐	☐	☐
3. locate sources from which to gather the needed information	☐	☐	☐	☐
4. gather the needed information	☐	☐	☐	☐
5. determine what additional information was needed	☐	☐	☐	☐
6. identify possible solutions	☐	☐	☐	☐
7. evaluate each possible solution	☐	☐	☐	☐
8. select a tentative solution	☐	☐	☐	☐
9. mentally evaluate the tentative solution	☐	☐	☐	☐
The teacher's directions were sufficiently clear that the student would be able to:				
10. use these same problem-solving steps to solve future problems he/she might encounter	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

NOTES

PROBLEM-SOLVING CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
Under the teacher's guidance and direction, the student was able to:				
1. clearly identify and define the problem	☐	☐	☐	☐
2. identify all major factors involved in the problem	☐	☐	☐	☐
3. locate sources from which to gather the needed information	☐	☐	☐	☐
4. gather the needed information	☐	☐	☐	☐
5. determine what additional information was needed	☐	☐	☐	☐
6. identify possible solutions	☐	☐	☐	☐
7. evaluate each possible solution	☐	☐	☐	☐
8. select a tentative solution	☐	☐	☐	☐
9. mentally evaluate the tentative solution	☐	☐	☐	☐
The teacher's directions were sufficiently clear that the student would be able to:				
10. use these same problem-solving steps to solve future problems he/she might encounter	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

NOTES

Read the following Case Study describing how Mr. Jones, a vocational teacher, aided a student in applying problem-solving techniques to a problem the student had encountered. As you read, try to determine what Mr. Jones is doing right and what he is doing wrong. At the end of the Case Study are some questions. Use these questions to guide you in preparing a written critique of Mr. Jones's performance in directing this student in applying problem-solving techniques.

CASE STUDY

Mr. Jones, a Building Trades instructor, was working at his desk one evening after school when Fred, one of his students, came by and asked to talk with him.

Mr. Jones said, "Come on in Fred. Is there something I can help you with?"

Fred replied, "I have decided to raise rabbits and need some help in deciding what kind of hutch to build for them."

"That is a good problem," said Mr. Jones, "and you seem to have it defined pretty well, but you need to contact someone who knows more about it than I do. Why don't you contact the county extension agent."

Fred contacted the agent and obtained a booklet on raising rabbits. After reviewing it, Fred came back to Mr. Jones and asked for help in developing a plan adapted to suit his own needs for a rabbit hutch. Mr. Jones asked Fred several questions about the number of rabbits involved, and the provisions for feeding the rabbits and cleaning the hutch.

After Fred and Mr. Jones had discussed these factors involved in planning how to construct hutches, Mr. Jones suggested that Fred sketch a few plans that might satisfy the requirements that they had identified in their discussion. Fred went ahead and sketched several plans and showed them to Mr. Jones.

Mr. Jones then asked Fred, "Which plan to you think will satisfy your needs at the most reasonable cost?"

Fred said, "I did not think about the cost at all, but maybe I'd better develop a list of materials and get an estimated cost for each plan."

So, Fred drew up a list of materials, went to a lumber yard and obtained a price for each plan. He then returned to Mr. Jones and told him that Plan B met the requirements satisfactorily at the lowest price for materials. Mr. Jones had Fred explain this decision more thoroughly, and both agreed that Plan B was the best choice. Fred then purchased the materials, built the hutch, and housed the rabbits in it.

A few days after Fred had finished the pen, Mr. Jones asked him, "How is the rabbit shelter working out for you?"

Fred replied, "It's working real well. I have five rabbits in the hutch. They're healthy, and the pen is easy to clean, too. I'm sure glad you were able to help me with my problem, Mr. Jones."

Did Mr. Jones do an adequate job in directing Fred in applying problem-solving techniques? How good a job did he do in guiding Fred through each of the steps in problem-solving? What were Mr. Jones' strengths and weaknesses? In areas in which he was weak, how could his performance have been improved?

NOTES

Compare your completed written critique of the Case Study with the Model Critique given below. Your responses need not exactly duplicate the model response; however, you should have covered the same **major** points.

MODEL CRITIQUE

Stating and Defining the Problem.—Fred stated his problem simply and clearly at the outset and Mr. Jones positively reinforced the statement. However, Mr. Jones should not have assumed from a single initial comment that Fred had clearly and thoroughly formulated and defined the problem. Mr. Jones should have spent more time verifying Fred's problem statement before sending him off to the county extension agent.

Identifying Relevant Factors.—This was done, but it was done rather haphazardly and disjointedly. Fred was sent off to gather data on hutch construction **before** identifying the factors involved in selecting the type of hutch to use. He was sent off to sketch plans for hutches **before** identifying the factors involved in selecting the types of materials to use.

Gathering Needed Information.—Mr. Jones suggested one good source of information: the county agent. In addition, by asking Fred about "cost," he prompted Fred to consider checking a lumber yard for information. However, as mentioned before, Mr. Jones should have directed Fred's efforts in a more organized manner instead of splitting up Fred's information-gathering efforts. Furthermore, Mr. Jones could have suggested other possible sources: a veterinarian, a library, a local breeder of rabbits, etc.

Also, Mr. Jones should have followed up on Fred's statement that he was going to "get an estimated cost for each plan." He should have made sure that Fred knew where to get this information, and he could have suggested that Fred get this information from more than one source. It is entirely possible that Fred could have gotten his materials more cheaply at some place other than the lumber yard he went to.

Examining Possible Solutions.—Mr. Jones did help Fred to examine possible solutions. Since he had had Fred develop **several** sketches, Fred was forced to look at alternative ways of solving the problem. This was a good technique, but it would have been even more meaningful if Mr. Jones had approached the problem-solving process more systematically. Had Fred checked other sources of information and materials, he might have been able to identify other possible solutions, some of which might have been better than what he actually identified.

Testing the Solution.—Fred tested the solution by building the hutch and housing the rabbits in it. This is an appropriate testing method; however, it might have been more meaningful if Fred had been aware that this was a "test" and had identified things to watch for during the test.

Assessing the Testing Results.—Mr. Jones followed up on Fred's efforts by asking Fred how well his solution was working. From Fred's brief answer, we can assume that the hutch Fred built was satisfactory. However, once again, Mr. Jones did not pursue the topic. He settled for a too brief, too simple statement.

Overall.—It's fortunate that Fred was able to function independently and that his solution worked, because Mr. Jones' direction was inadequate and disorganized. Mr. Jones did not move Fred through the process step by step. Even more critical, Mr. Jones did not probe deeply enough at all points. He seemed to just **assume** that Fred knew what he was doing or what he needed to do.

LEVEL OF PERFORMANCE: Your completed critique should have covered the same **major** points as the model response. If you missed some points or have questions about any additional points you made, review the material in the information sheet, Directing Students in Applying Problem-Solving Techniques, pp. 6–15, or check with your resource person if necessary.

NOTES

Learning Experience III

OVERVIEW

For a simulated classroom situation, execute, or critique the execution of, a problem-solving lesson.

NOTE The next seven items involve presenting a lesson to a group of peers. If peers are not available to you, proceed directly to the explanation of the alternate activity which follows.

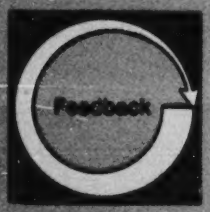
You will be selecting a student performance objective in your occupational specialty that lends itself to using the problem-solving method.

You will be selecting, modifying, or developing a lesson plan designed to achieve that objective using the problem-solving method.

You may wish to have your resource person review the adequacy of your plan.

You will be presenting the lesson to a group of peers.

You may wish to record your presentation on videotape for self-evaluation purposes.



Your competency in presenting a problem-solving lesson will be evaluated by your peers, using the Lesson Presentation Checklist, pp. 37–48.

If you videotaped your presentation, you may wish to evaluate your own performance, using the Lesson Presentation Checklist, pp. 37–48.

You will be reading the Case Study, p. 49, and writing a critique of the performance of the teacher described.

You will be evaluating your competency in critiquing the teacher's performance in presenting a problem-solving lesson by comparing your completed critique with the Model Critique, pp. 51–52.

NOTE: The following activities involve presenting a lesson to a group of peers. If peers are not available to you, turn to p. 49 for an explanation of the alternate activity.

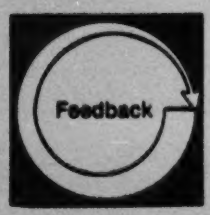
Select a student performance objective in your occupational specialty which could be achieved, at least partially, by using the problem-solving method. (In a real world situation, you start with an objective and then select the most appropriate materials and/or teaching methods. In this practice situation, however, you need to select an objective that lends itself to using the problem-solving method.)

Prepare a detailed lesson plan which includes an explanation of how the problem-solving method will be used. Instead of developing a lesson plan, you may select a lesson plan that you have developed previously, and adapt that plan so that it includes the use of problem-solving methods. In preparing the plan, develop **two** alternate introductions: one in which you present the problem area and then guide students in identifying the specific problem to be solved; and one in which the problem is presented in the form of a case problem.

You may wish to have your resource person review the adequacy of your plan. He/she could use the Teacher Performance Assessment Form in Module B–4, *Develop a Lesson Plan*, as a guide.

In a simulated classroom or laboratory situation, present your lesson (using one of the two introductions) to a group of two to five peers. These peers will serve three functions: (1) they will role-play the students to whom you are presenting your lesson, (2) they will apply problem-solving techniques under your direction, and (3) they will evaluate your performance in presenting a problem-solving lesson.

If you wish to self-evaluate, you may record your performance on videotape so you may view your own presentation at a later time.



Multiple copies of the Lesson Presentation Checklist are provided in this learning experience. Give a copy to each peer before making your presentation in order to ensure that each knows what to look for in your lesson. However, indicate that during the lesson, all attention is to be directed toward you, and that the checklists are to be completed **after** the lesson is finished.

If you videotaped your lesson, you may wish to self-evaluate using a copy of the Lesson Presentation Checklist.

LESSON PRESENTATION CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
1. The introduction was interesting and motivating	☐	☐	☐	☐
2. The introduction clearly identified the purpose (objective) of the lesson	☐	☐	☐	☐
3. The presentation included adequate directions for, and guidance in: a. clearly identifying and defining the problem	☐	☐	☐	☐
b. identifying all major factors involved in the problem	☐	☐	☐	☐
c. listing specific questions to guide students in gathering information	☐	☐	☐	☐
d. locating sources from which to gather the needed information	☐	☐	☐	☐
e. gathering the needed information	☐	☐	☐	☐
f. determining what additional information was needed	☐	☐	☐	☐
g. identifying possible solutions	☐	☐	☐	☐
h. evaluating each possible solution	☐	☐	☐	☐
i. selecting a tentative solution	☐	☐	☐	☐
j. testing or mentally evaluating the tentative solution	☐	☐	☐	☐
k. assessing the results of testing (if possible)	☐	☐	☐	☐
4. The teacher helped students to summarize what had been covered and/or determined during the lesson	☐	☐	☐	☐
5. The teacher evaluated (or helped students to evaluate) student achievement of the lesson objectives	☐	☐	☐	☐
6. The teacher involved students actively in solving the problem by asking questions, encouraging discussion, seeking feedback, etc.	☐	☐	☐	☐
7. The teacher's directions and guidance were such that the students should be able to use these same problem-solving steps to solve future problems	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

LESSON PRESENTATION CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
1. The introduction was interesting and motivating	☐	☐	☐	☐
2. The introduction clearly identified the purpose (objective) of the lesson	☐	☐	☐	☐
3. The presentation included adequate directions for, and guidance in:				
a. clearly identifying and defining the problem	☐	☐	☐	☐
b. identifying all major factors involved in the problem	☐	☐	☐	☐
c. listing specific questions to guide students in gathering information	☐	☐	☐	☐
d. locating sources from which to gather the needed information	☐	☐	☐	☐
e. gathering the needed information	☐	☐	☐	☐
f. determining what additional information was needed	☐	☐	☐	☐
g. identifying possible solutions	☐	☐	☐	☐
h. evaluating each possible solution	☐	☐	☐	☐
i. selecting a tentative solution	☐	☐	☐	☐
j. testing or mentally evaluating the tentative solution	☐	☐	☐	☐
k. assessing the results of testing (if possible)	☐	☐	☐	☐
4. The teacher helped students to summarize what had been covered and/or determined during the lesson	☐	☐	☐	☐
5. The teacher evaluated (or helped students to evaluate) student achievement of the lesson objectives	☐	☐	☐	☐
6. The teacher involved students actively in solving the problem by asking questions, encouraging discussion, seeking feedback, etc.	☐	☐	☐	☐
7. The teacher's directions and guidance were such that the students should be able to use these same problem-solving steps to solve future problems	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

LESSON PRESENTATION CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

LEVEL OF PERFORMANCE

	N/A	No	Partial	Full
1. The introduction was interesting and motivating	☐	☐	☐	☐
2. The introduction clearly identified the purpose (objective) of the lesson	☐	☐	☐	☐
3. The presentation included adequate directions for, and guidance in: a. clearly identifying and defining the problem	☐	☐	☐	☐
b. identifying all major factors involved in the problem	☐	☐	☐	☐
c. listing specific questions to guide students in gathering information	☐	☐	☐	☐
d. locating sources from which to gather the needed information	☐	☐	☐	☐
e. gathering the needed information	☐	☐	☐	☐
f. determining what additional information was needed	☐	☐	☐	☐
g. identifying possible solutions	☐	☐	☐	☐
h. evaluating each possible solution	☐	☐	☐	☐
i. selecting a tentative solution	☐	☐	☐	☐
j. testing or mentally evaluating the tentative solution	☐	☐	☐	☐
k. assessing the results of testing (if possible)	☐	☐	☐	☐
4. The teacher helped students to summarize what had been covered and/or determined during the lesson	☐	☐	☐	☐
5. The teacher evaluated (or helped students to evaluate) student achievement of the lesson objectives	☐	☐	☐	☐
6. The teacher involved students actively in solving the problem by asking questions, encouraging discussion, seeking feedback, etc.	☐	☐	☐	☐
7. The teacher's directions and guidance were such that the students should be able to use these same problem-solving steps to solve future problems	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

LESSON PRESENTATION CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
1. The introduction was interesting and motivating	☐	☐	☐	☐
2. The introduction clearly identified the purpose (objective) of the lesson	☐	☐	☐	☐
3. The presentation included adequate directions for, and guidance in:				
a. clearly identifying and defining the problem	☐	☐	☐	☐
b. identifying all major factors involved in the problem	☐	☐	☐	☐
c. listing specific questions to guide students in gathering information	☐	☐	☐	☐
d. locating sources from which to gather the needed information	☐	☐	☐	☐
e. gathering the needed information	☐	☐	☐	☐
f. determining what additional information was needed	☐	☐	☐	☐
g. identifying possible solutions	☐	☐	☐	☐
h. evaluating each possible solution	☐	☐	☐	☐
i. selecting a tentative solution	☐	☐	☐	☐
j. testing or mentally evaluating the tentative solution	☐	☐	☐	☐
k. assessing the results of testing (if possible)	☐	☐	☐	☐
4. The teacher helped students to summarize what had been covered and/or determined during the lesson	☐	☐	☐	☐
5. The teacher evaluated (or helped students to evaluate) student achievement of the lesson objectives	☐	☐	☐	☐
6. The teacher involved students actively in solving the problem by asking questions, encouraging discussion, seeking feedback, etc.	☐	☐	☐	☐
7. The teacher's directions and guidance were such that the students should be able to use these same problem-solving steps to solve future problems	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

LESSON PRESENTATION CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
1. The introduction was interesting and motivating	☐	☐	☐	☐
2. The introduction clearly identified the purpose (objective) of the lesson	☐	☐	☐	☐
3. The presentation included adequate directions for, and guidance in: a. clearly identifying and defining the problem	☐	☐	☐	☐
b. identifying all major factors involved in the problem	☐	☐	☐	☐
c. listing specific questions to guide students in gathering information	☐	☐	☐	☐
d. locating sources from which to gather the needed information	☐	☐	☐	☐
e. gathering the needed information	☐	☐	☐	☐
f. determining what additional information was needed	☐	☐	☐	☐
g. identifying possible solutions	☐	☐	☐	☐
h. evaluating each possible solution	☐	☐	☐	☐
i. selecting a tentative solution	☐	☐	☐	☐
j. testing or mentally evaluating the tentative solution	☐	☐	☐	☐
k. assessing the results of testing (if possible)	☐	☐	☐	☐
4. The teacher helped students to summarize what had been covered and/or determined during the lesson	☐	☐	☐	☐
5. The teacher evaluated (or helped students to evaluate) student achievement of the lesson objectives	☐	☐	☐	☐
6. The teacher involved students actively in solving the problem by asking questions, encouraging discussion, seeking feedback, etc.	☐	☐	☐	☐
7. The teacher's directions and guidance were such that the students should be able to use these same problem-solving steps to solve future problems	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

LESSON PRESENTATION CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
1. The introduction was interesting and motivating	☐	☐	☐	☐
2. The introduction clearly identified the purpose (objective) of the lesson	☐	☐	☐	☐
3. The presentation included adequate directions for, and guidance in:				
a. clearly identifying and defining the problem	☐	☐	☐	☐
b. identifying all major factors involved in the problem	☐	☐	☐	☐
c. listing specific questions to guide students in gathering information	☐	☐	☐	☐
d. locating sources from which to gather the needed information	☐	☐	☐	☐
e. gathering the needed information	☐	☐	☐	☐
f. determining what additional information was needed	☐	☐	☐	☐
g. identifying possible solutions	☐	☐	☐	☐
h. evaluating each possible solution	☐	☐	☐	☐
i. selecting a tentative solution	☐	☐	☐	☐
j. testing or mentally evaluating the tentative solution	☐	☐	☐	☐
k. assessing the results of testing (if possible)	☐	☐	☐	☐
4. The teacher helped students to summarize what had been covered and/or determined during the lesson	☐	☐	☐	☐
5. The teacher evaluated (or helped students to evaluate) student achievement of the lesson objectives	☐	☐	☐	☐
6. The teacher involved students actively in solving the problem by asking questions, encouraging discussion, seeking feedback, etc.	☐	☐	☐	☐
7. The teacher's directions and guidance were such that the students should be able to use these same problem-solving steps to solve future problems	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

Read the following Case Study describing how Ms. O'Connell, a vocational teacher, presented a problem-solving lesson to her first period class. As you read, try to determine what Ms. O'Connell is doing right and what she is doing wrong. At the end of the Case Study are some questions. Use these questions to guide you in preparing a written critique of Ms. O'Connell's performance in presenting a problem-solving lesson.

CASE STUDY

The principal of the high school where Ms. O'Connell is employed as a first year vocational education teacher came to her and requested her assistance. The principal wanted her to serve on a committee to investigate the desirability of developing a "commons area" for seniors. The commons area would be a place where the students could come during a study hall, a free period, or after lunch to talk and obtain refreshments.

Since Ms. O'Connell had a great many seniors in her first period class, she decided to present the problem to them for their consideration. Although the situation did not pertain directly to her teaching area, it did present an opportunity to try out her skills and ideas in directing students in applying problem-solving techniques.

The next day in her first period class, she presented the idea by asking the students if they knew what a commons area was and how it could be used in the school. Several students knew the answer and she asked them to explain it to the rest of the class. She indicated that a commons area was being considered for seniors, but that there were several problems that must be overcome.

After soliciting several potential problems from the students and writing them on the blackboard, she asked them to select the one that they would consider to be most critical to the success of the project. The students voted on the list and decided that the problem of how it could be managed in an orderly and clean manner would be the most critical.

At this point Ms. O'Connell asked them to write a statement of the problem in their own language and turn it in to her. The statements were collected and she looked them over that night to see if her students had been able to define the problem clearly and concisely. As she looked at their written responses, she realized that most students had grasped the problem and stated it well.

This information motivated her to contact the principal and make arrangements for him to come to her class the next morning. She asked him to give the students the information they needed to know on managing a commons area in terms of student behavior and cleanliness. After the principal's presentation, she divided the class into small groups and charged them with the responsibility of developing several alternative solutions to the problem based upon the comments of the principal.

As Ms. O'Connell circulated among the students, she discovered several alternatives developing that ranged from one of complete compliance with the principal's viewpoints to one of rejection of all the statements made by the principal. As the discussion concluded, she brought the class together for a group report. Several of the alternatives were presented and listed on the chalkboard. Each one was discussed and it became clear to Ms. O'Connell that a tentative solution was being formulated by the class which would be in conflict with the administration's viewpoints.

At this point, she decided that the solution being formulated was too radical. She brought the discussion to a close by informing the students of the consequences of their decision. She stated that their solution was unworkable, but that she hoped that they had learned something about the problem-solving process. Problem-solving, she said, had really been the purpose of the activity during the past few days.

What are the strengths and weaknesses in Ms. O'Connell's preparation and presentation of a problem-solving lesson? Did she follow the basic steps in the problem-solving procedure? Justify your responses.

NOTES

Compare your completed written critique of the Case Study with the Model Critique given below. Your responses need not exactly duplicate the model response; however, you should have covered the same **major** points.

MODEL CRITIQUE

Lesson Topic.—It is a good idea to select lesson topics which allow students to develop their problem-solving skills. However, it is preferable to select topics which relate to the course or unit being taught. The commons-area topic was **not** really pertinent to the course, and it is questionable whether an entire class period should have been used in discussing that topic.

Lesson Preparation.—One of the clues as to why Ms. O'Connell's lesson was unproductive is that there is no evidence whatsoever that she did any planning for the lesson. In using the problem-solving method to present a lesson, it is critical that you plan in advance how you are going to direct students in handling each step. Planning ahead also allows you to anticipate any snags which may arise, and determine how to handle those situations.

Introducing the Problem.—Ms. O'Connell's use of questions to get students involved and interested in the topic was quite effective. Since these students are seniors, the problem was of immediate and practical concern to them. Her questions capitalized on that concern and, thus, she succeeded in capturing their attention and interest.

Stating and Defining the Problem.—One does not have students select a problem by voting. This procedure can result in the identification of a problem that is not relevant or important. Ms. O'Connell should have **planned** how students would arrive at the problem to be solved. By carefully guiding students with a series of prepared questions, she could have led them to a single problem to be solved.

As it is, the question, "Which problem is most critical?" is in itself a problem statement which can be solved through problem-solving techniques. In addition, we have no evidence that she gave the students any direction in writing a good problem statement. "Write a statement of the problem in your own language" is not adequate.

Identifying Relevant Factors.—The only "factors" that were identified were in terms of the various problems that would be involved in establishing and maintaining a commons area. If the problem statement were "Which problem is most critical?" then those factors would be relevant.

However, if the problem statement were "How can the commons area be managed in an orderly and clean manner?" then identifying other problems would not be relevant. Again, the vagueness as to exactly what the problem statement is (or the way the problem changes as she goes along) is primarily responsible for these weaknesses.

Gathering Needed Information.—One weakness in this step was that the students began gathering information without having identified factors related to the problem. Secondly, the teacher should have used more than one source of information. The use of a single source is too narrow and, in this case, one-sided. Given only the principal's views to go on, it is not surprising that students reacted by simply complying with or rejecting the principal's views.

Examining Possible Solutions.—Dividing the class into small groups to examine alternatives is a good technique for obtaining maximum involvement of each student. Unfortunately, students did not have enough factual information to deal rationally with the task. Furthermore, Ms. O'Connell's directions for developing alternatives were quite inadequate. Circulating among the students is a good technique, but she could have guided their progress more, rather than simply monitoring their progress.

Selecting a Tentative Solution/Testing the Solution/Assessing the Testing Results.—We know that "several" alternatives were listed on the board. Why just "several"? In selecting a tentative solution, all possible solutions should be considered and evaluated. The lesson deteriorates rapidly from this point.

If the tentative solution was rational, then it should not have been rejected simply on the basis that it conflicted with the administration's viewpoint. The tentative solution was never really completely formulated; it was not tested; and no testing results were assessed. The whole subject was merely abruptly and prematurely dropped.

The final brief and negative summary could very easily have created bad feelings in students concerning problem-solving. It is very frustrating to apply yourself to a task only to be told that it was merely an exercise—that your opinions weren't really wanted at all. Being treated in this way can make people very apathetic or skeptical about participating in future activities.

Overall.—If Ms. O'Connell's objective was to help students "learn something about the problem-solving process," she undoubtedly failed. She failed to complete the process in a step-by-step, thorough manner. She neglected to explain the procedures for completing each step. And, she negated the entire activity by rejecting their efforts prematurely and arbitrarily. It is unlikely that her students learned to use problem-solving techniques. It is less likely that they'd ever want to use a technique for which they received such negative reinforcement.

LEVEL OF PERFORMANCE: Your completed critique should have covered the same **major** points as the model response. If you missed some points or have questions about any additional points you made, review the material in the information sheet, Directing Students in Applying Problem-Solving Techniques, pp. 6–15, or check with your resource person if necessary.

Learning Experience IV

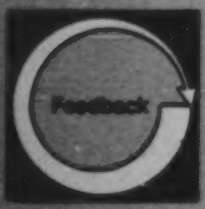
FINAL EXPERIENCE

In an actual school situation,* direct students in applying problem-solving techniques.

As you plan your lessons, decide when problem-solving techniques could be used effectively to aid in meeting the lesson objectives. Based on that decision, direct students in applying problem-solving techniques. This will include—

- selecting, modifying, or developing a lesson plan which includes the use of these techniques
- determining how the problem will be identified: from student needs, through directed questioning, or using a case study
- preparing lists of questions to direct students during the lesson, or one or more case studies for students to work with
- presenting the lesson to the class

NOTE: Your resource person may want you to submit your written lesson plan to him/her for evaluation before you present your lesson. It may be helpful for your resource person to use the TPAF from Module B–4, *Develop a Lesson Plan*, to guide his/her evaluation.



Arrange in advance to have your resource person observe your lesson presentation.

Your total competency will be assessed by your resource person, using the Teacher Performance Assessment Form, pp. 55–56.

Based upon the criteria specified in this assessment instrument, your resource person will determine whether you are competent in directing students in applying problem-solving techniques.

*For a definition of "actual school situation," see the inside back cover.

NOTES

TEACHER PERFORMANCE ASSESSMENT FORM

Direct Students in Applying Problem-Solving Techniques (C–8)

Name _____

Date _____

Resource Person _____

Directions: Indicate the level of the teacher's accomplishment by placing an X in the appropriate box under the LEVEL OF PERFORMANCE heading. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

	LEVEL OF PERFORMANCE					
	N/A	None	Poor	Fair	Good	Excellent
1. The introduction was interesting and motivating	☐	☐	☐	☐	☐	☐
2. The introduction clearly identified the purpose (objective) of the lesson	☐	☐	☐	☐	☐	☐
3. The objective was one which lends itself to the use of problem-solving techniques	☐	☐	☐	☐	☐	☐
4. If a case problem was used, it:						
a. was designed to help students meet the lesson objective	☐	☐	☐	☐	☐	☐
b. was well-developed	☐	☐	☐	☐	☐	☐
c. included all the information needed by the students to work with the problem	☐	☐	☐	☐	☐	☐
5. The presentation included adequate directions for, and guidance in:						
a. clearly identifying and defining the problem	☐	☐	☐	☐	☐	☐
b. identifying all major factors involved in the problem	☐	☐	☐	☐	☐	☐
c. listing specific questions to guide students in gathering information	☐	☐	☐	☐	☐	☐
d. locating sources from which to gather the needed information	☐	☐	☐	☐	☐	☐
e. gathering the needed information	☐	☐	☐	☐	☐	☐
f. determining what additional information was needed	☐	☐	☐	☐	☐	☐
g. identifying possible solutions	☐	☐	☐	☐	☐	☐
h. evaluating each possible solution	☐	☐	☐	☐	☐	☐
i. selecting a tentative solution	☐	☐	☐	☐	☐	☐
j. testing or mentally evaluating the tentative solution	☐	☐	☐	☐	☐	☐

	N/A	None	Poor	Fair	Good	Excellent
k. assessing the results of testing (if possible)	☐	☐	☐	☐	☐	☐
6. The teacher helped students to summarize what had been covered and/or determined during the lesson	☐	☐	☐	☐	☐	☐
7. The teacher evaluated (or helped students to evaluate) student achievement of the lesson objectives	☐	☐	☐	☐	☐	☐
8. The teacher involved students actively in solving the problem by asking questions, encouraging discussion, seeking feedback, etc.	☐	☐	☐	☐	☐	☐
9. The teacher's directions and guidance were such that the students should be able to use these same problem-solving steps to solve future problems.	☐	☐	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive N/A, GOOD, or EXCELLENT responses. If any item receives a NONE, POOR, or FAIR response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

ABOUT USING THE CENTER'S PBTE MODULES

Organization

Each module is designed to help you gain competency in a particular skill area considered important to teaching success. A module is made up of a series of learning experiences, some providing background information, some providing practice experiences, and others combining these two functions. Completing these experiences should **enable** you to achieve the **terminal** objective in the final learning experience. The final experience in each module always requires you to demonstrate the skill in an actual school situation when you are an intern, a student teacher, or an inservice teacher.

Procedures

Modules are designed to allow you to individualize your teacher education program. You need to take only those modules covering skills which you do not already possess. Similarly, you need not complete any learning experience within a module if you already have the skill needed to complete it. Therefore, before taking any module, you should carefully review (1) the Introduction, (2) the Objectives listed on p. 4, (3) the Overviews preceding each learning experience, and (4) the Final Experience. After comparing your present needs and competencies with the information you have read in these sections, you should be ready to make one of the following decisions:

- that you do not have the competencies indicated, and should complete the entire module
- that you are competent in one or more of the enabling objectives leading to the final learning experience, and thus can omit that (those) learning experience(s)
- that you are already competent in this area, and ready to complete the final learning experience in order to "test out"
- that the module is inappropriate to your needs at this time

When you are ready to take the final learning experience and have access to an actual school situation, make the necessary arrangements with your resource person. If you do not complete the final experience successfully, meet with your resource person and arrange (1) to repeat the experience, or (2) complete (or review) previous sections of the module or other related activities suggested by your resource person before attempting to repeat the final experience.

Options for recycling are also available in each of the learning experiences preceding the final experience. Any time you do not meet the minimum level of performance required to meet an objective, you and your resource person may meet to select activities to help you reach competency. This could involve (1) completing parts of the module previously skipped; (2) repeating activities; (3) reading supplementary resources or completing additional activities suggested by the resource person; (4) designing your own learning experience; or (5) completing some other activity suggested by you or your resource person.

Terminology

Actual School Situation . . . refers to a situation in which you are actually working with, and responsible for, secondary or post-secondary vocational students in a real school. An intern, a student teacher, or an inservice teacher would be functioning in an actual school situation. If you do **not** have access to an actual school situation when you are taking the module, you can complete the module **up to** the final learning experience. You would then do the final learning experience later; i.e., when you have access to an actual school situation.

Alternate Activity or Feedback . . . refers to an item or feedback device which may **substitute** for required items which, due to special circumstances, you are unable to complete.

Occupational Specialty . . . refers to a specific area of preparation within a vocational service area (e.g., the service area Trade and Industrial Education includes occupational specialties such as automobile mechanics, welding, and electricity).

Optional Activity or Feedback . . . refers to an item which is not required, but which is designed to **supplement** and enrich the required items in a learning experience.

Resource Person . . . refers to the person in charge of your educational program; the professor, instructor, administrator, supervisor, or cooperating/supervising/classroom teacher who is guiding you in taking this module.

Student . . . refers to the person who is enrolled and receiving instruction in a secondary or post-secondary educational institution.

Vocational Service Area . . . refers to a major vocational field: agricultural education, business and office education, distributive education, health occupations education, home economics education, industrial arts education, technical education, or trade and industrial education.

You or the Teacher . . . refers to the person who is taking the module.

Levels of Performance for Final Assessment

N/A . . . The criterion was not met because it was **not applicable** to the situation.
None . . . **No attempt** was made to meet the criterion, although it was relevent.
Poor . . . The teacher is unable to perform this skill or has only **very limited ability** to perform it.
Fair . . . The teacher is unable to perform this skill in an acceptable manner, but has **some ability** to perform it.
Good . . . The teacher is able to perform this skill in an **effective** manner.
Excellent . . . The teacher is able to perform this skill in a **very effective** manner.

Titles of The Center's Performance-Based Teacher Education Modules

Category A: Program Planning, Development, and Evaluation

- A-1 Prepare for a Community Survey
- A-2 Conduct a Community Survey
- A-3 Report the Findings of a Community Survey
- A-4 Organize an Occupational Advisory Committee
- A-5 Maintain an Occupational Advisory Committee
- A-6 Develop Program Goals and Objectives
- A-7 Conduct an Occupational Analysis
- A-8 Develop a Course of Study
- A-9 Develop Long-Range Program Plans
- A-10 Conduct a Student Follow-Up Study
- A-11 Evaluate Your Vocational Program

Category B: Instructional Planning

- B-1 Determine Needs and Interests of Students
- B-2 Develop Student Performance Objectives
- B-3 Develop a Unit of Instruction
- B-4 Develop a Lesson Plan
- B-5 Select Student Instructional Materials
- B-6 Prepare Teacher-Made Instructional Materials

Category C: Instructional Execution

- C-1 Direct Field Trips
- C-2 Conduct Group Discussions, Panel Discussions, and Symposiums
- C-3 Employ Brainstorming, Buzz Group, and Question Box Techniques
- C-4 Direct Students in Instructing Other Students
- C-5 Employ Simulation Techniques
- C-6 Guide Student Study
- C-7 Direct Student Laboratory Experience
- C-8 Direct Students in Applying Problem-Solving Techniques
- C-9 Employ the Project Method
- C-10 Introduce a Lesson
- C-11 Summarize a Lesson
- C-12 Employ Oral Questioning Techniques
- C-13 Employ Reinforcement Techniques
- C-14 Provide Instruction for Slower and More Capable Learners
- C-15 Present an Illustrated Talk
- C-16 Demonstrate a Manipulative Skill
- C-17 Demonstrate a Concept or Principle
- C-18 Individualize Instruction
- C-19 Employ the Team Teaching Approach
- C-20 Use Subject Matter Experts to Present Information
- C-21 Prepare Bulletin Boards and Exhibits
- C-22 Present Information with Models, Real Objects, and Flannel Boards
- C-23 Present Information with Overhead and Opaque Materials
- C-24 Present Information with Filmstrips and Slides
- C-25 Present Information with Films
- C-26 Present Information with Audio Recordings
- C-27 Present Information with Televised and Videotaped Materials
- C-28 Employ Programmed Instruction
- C-29 Present Information with the Chalkboard and Flip Chart

Category D: Instructional Evaluation

- D-1 Establish Student Performance Criteria
- D-2 Assess Student Performance: Knowledge
- D-3 Assess Student Performance: Attitudes
- D-4 Assess Student Performance: Skills
- D-5 Determine Student Grades
- D-6 Evaluate Your Instructional Effectiveness

Category E: Instructional Management

- E-1 Project Instructional Resource Needs
- E-2 Manage Your Budgeting and Reporting Responsibilities
- E-3 Arrange for Improvement of Your Vocational Facilities
- E-4 Maintain a Filing System
- E-5 Provide for Student Safety
- E-6 Provide for the First Aid Needs of Students
- E-7 Assist Students in Developing Self-Discipline
- E-8 Organize the Vocational Laboratory
- E-9 Manage the Vocational Laboratory

Category F: Guidance

- F-1 Gather Student Data Using Formal Data-Collection Techniques
- F-2 Gather Student Data Through Personal Contacts
- F-3 Use Conferences to Help Meet Student Needs
- F-4 Provide Information on Educational and Career Opportunities
- F-5 Assist Students in Applying for Employment or Further Education

Category G: School-Community Relations

- G-1 Develop a School-Community Relations Plan for Your Vocational Program
- G-2 Give Presentations to Promote Your Vocational Program
- G-3 Develop Brochures to Promote Your Vocational Program
- G-4 Prepare Displays to Promote Your Vocational Program
- G-5 Prepare News Releases and Articles Concerning Your Vocational Program
- G-6 Arrange for Television and Radio Presentations Concerning Your Vocational Program
- G-7 Conduct an Open House
- G-8 Work with Members of the Community
- G-9 Work with State and Local Educators
- G-10 Obtain Feedback about Your Vocational Program

Category H: Student Vocational Organization

- H-1 Develop a Personal Philosophy Concerning Student Vocational Organizations
- H-2 Establish a Student Vocational Organization
- H-3 Prepare Student Vocational Organization Members for Leadership Roles
- H-4 Assist Student Vocational Organization Members in Developing and Financing a Yearly Program of Activities
- H-5 Supervise Activities of the Student Vocational Organization
- H-6 Guide Participation in Student Vocational Organization Contests

Category I: Professional Role and Development

- I-1 Keep Up-to-Date Professionally
- I-2 Serve Your Teaching Profession
- I-3 Develop an Active Personal Philosophy of Education
- I-4 Serve the School and Community
- I-5 Obtain a Suitable Teaching Position
- I-6 Provide Laboratory Experiences for Prospective Teachers
- I-7 Plan the Student Teaching Experience
- I-8 Supervise Student Teachers

Category J: Coordination of Cooperative Education

- J-1 Establish Guidelines for Your Cooperative Vocational Program
- J-2 Manage the Attendance, Transfers, and Terminations of Co-Op Students
- J-3 Enroll Students in Your Co-Op Program
- J-4 Secure Training Stations for Your Co-Op Program
- J-5 Place Co-Op Students on the Job
- J-6 Develop the Training Ability of On-the-Job Instructors
- J-7 Coordinate On-the-Job Instruction
- J-8 Evaluate Co-Op Students' On-the-Job Performance
- J-9 Prepare for Students' Related Instruction
- J-10 Supervise an Employer-Employee Appreciation Event

RELATED PUBLICATIONS

- Student Guide to Using Performance-Based Teacher Education Materials
- Resource Person Guide to Using Performance-Based Teacher Education Materials
- Guide to the Implementation of Performance-Based Teacher Education

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